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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/786,815	02/24/2004	David R. Sosnowski	03-ASD-202 (SR)	5139

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EXAMINER
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DEB, ANJAN K

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 05/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/786,815

Applicant(s)

SOSNOWSKI ET AL.

Examiner

Anjan K. Deb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 24 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 02/24/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-3, 5-7, 9 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 10/786,818 in view of McGinnis et al. (US 6,377,052 B1).

This is a provisional obviousness-type double patenting rejection.

Re claim 1, copending Application No. 10/786,818 recites the following limitations:

a) disposing at least two electrodes (one electrode, second electrode) in the lubricant (fluid) and applying a relatively low voltage alternating current (see claim 3, low voltage=0.1-2.0 volt) to one of said electrodes and sweeping the frequency of the voltage over a predetermined range;

(b) measuring the current (see claim 1(c) of copending application) and phase angle (see claim 4 of copending application) at a second of said electrodes at predetermined frequency intervals during the sweep and computing the reactance and resistance at each current measurement;

(c) determining the least value of reactance from said computing (see claim 1 (c) "minimum value of reactance" recited in copending application);

(d) selecting a frequency  $f_i$  less than the frequency corresponding to  $Z''_{\min}$  (see claim 1 (g) of copending application);

(e) exciting said one electrode with said voltage at the frequency  $f_i$  and measuring the current and phase angle at said second electrode and computing the reactance  $Z''_i$  and the resistance  $Z'_i$  (see claim 1(g) of copending application);

Copending Application No. 10/786,818 does not recite the following limitations:

(f) determining the parameter  $\Theta = \arctan \Delta Z'' / \Delta Z'$ , where  $\Delta Z''$  is the change in reactance ( $Z''_i - Z''_{\min}$ ) and  $\Delta Z'$  is the change in resistance ( $Z'_i - Z'_{@Z''_{\min}}$ );

and,

(g) providing an indication that coolant contamination exists when  $\Theta$  reaches a predetermined value.

McGinnis et al. disclose monitoring fluid condition by measuring change in impedance  $\Delta Z$  (impedance includes resistance and reactance)(Fig. 9B: 112 ) and phase shift angle (see

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abstract) . Phase shift angle is broadly interpreted as determining the parameter

$$\Theta = \arctan \Delta Z'' / \Delta Z'.$$

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 by adding determining the parameter  $\Theta$  (phase shift angle) disclosed by McGinnis et al. for monitoring fluid condition.

Re claim 2, Copending Application No. 10/786,818 recites measuring current by sweeping over a range of frequencies indicative of bulk  $Z_{nm}$  and surface electrode impedance  $Z_s$  (see claim 1 of copending application).

Re claim 3, Copending Application No. 10/786,818 and McGinnis et al. did not recite providing contamination indication when  $\Theta$  reaches an angle of about  $40^\circ$ .

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 by adding contamination indication when  $\Theta$  reaches an angle of about  $40^\circ$  for determining fluid condition since McGinnis et al. teaches monitoring fluid condition as a function of phase angle and the specific value of phase angle for indication would depend upon the particular application.

Re claim 5, Copending Application No. 10/786,818 recites the limitation of sweeping the frequency in the range 1 mHz to 10 kHz (see claim 2 of copending application).

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Re claim 6, Copending Application No. 10/786,818 recites the limitation of applying ac voltage in the range .10 to 2.0 volts (see claim 3 of copending application).

Re claim 7, Copending Application No. 10/786,818 did not recite the limitation wherein said step of measuring current at predetermined intervals includes measuring the current at intervals of about one-tenth of each decade of frequency sweep.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 by measuring the current at intervals of about one-tenth of each decade of frequency sweep for improving measurement accuracy.

Re claim 9, Copending Application No. 10/786,818 did not recites the limitation wherein the step of providing an indication that contamination exists includes providing such when  $\Theta$  is about 45 less than the value of  $\Theta$  for new uncontaminated lubricant.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 by adding contamination indication when  $\Theta$  reaches an angle of about  $40^\circ$  for determining fluid condition since McGinnis et al. teaches monitoring fluid condition as a function of phase angle and the specific value of phase angle for indication would depend upon the particular application.

3. Claims 4,8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No.

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10/786,818 in view of McGinnis et al. (US 6,377,052 B1) and further in view of Lvovich (US 6,861,851 B2).

Re claim 4, Copending Application No. 10/786,818 and McGinnis et al. did not recite electrodes spaced in concentric arrangement.

Lvovich (US 6,861,851 B2) disclose apparatus for monitoring fluid condition comprising concentric electrodes (column 5 lines 40-53).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 and McGinnis et al. by adding concentric electrodes disclosed by Lvovich as an alternative to flat electrodes for monitoring fluid condition.

Re claim 8, Copending Application No. 10/786,818 did not recite the limitation wherein the step of applying a relatively low voltage alternating current includes measuring the lubricant temperature and delaying the said applying until the temperature is within predetermined limits.

McGinnis et al. disclose temperature sensor is included on the distal end of the fluid monitoring probe for providing a temperature measurement of the fluid. However, McGinnis et al. did not expressly disclose delaying the said applying until the temperature is within predetermined limits.

Lvovich discloses measuring fluid condition at a constant temperature or within a specified temperature range. Lvovich did not expressly disclose delaying the said applying until

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the temperature is within predetermined limits but would have been obvious to do so in order to measure fluid condition within the specified temperature range.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Copending Application No. 10/786,818 and McGinnis et al. by adding the step of delaying applying AC voltage to electrode until the temperature is within predetermined limits so that the condition of fluid can be observed within a specified temperature range that the fluid is expected to operate as disclosed by Lvovich.

***Pertinent Art***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Schilowitz et al. disclose method of monitoring fluid condition in situ [para 0020,0022]] comprising (a) measuring and recording the temperature of the fluid (Fig. 3); (b) disposing electrodes in the fluid and exciting one electrode with an alternating current voltage and sweeping the frequency thereof over a certain range [para 0020, 0023]; (c) measuring the current (charge)[0023] in a second electrode and computing the reactance ( $Z''$ ) and resistance ( $Z'$ ) at a plurality of predetermined intervals of frequency in the range [para 0025]; (d) determining the frequency in said range associated with the minimum value of reactance (Fig. 3).

Hu (US 2004/0239344 A1) discloses method of monitoring fluid condition in situ (on-line) [para 0008] comprising disposing electrodes 11 in fluid and exciting one electrode with an



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alternating current voltage and measuring real and reactive impedance of the fluid by sweeping the frequency thereof over a certain range of frequencies in the range (0.1 Hz to 1 Mhz) and analyzing the impedance spectrum using pattern recognition algorithm which compares impedance spectra stored in memory to determine fluid condition.

Lin (US 2005/0017738 A1) discloses method of monitoring fluid condition (Diesel engine lubrication oil) by applying alternating current voltage in a range of frequencies, measuring current at each frequency in the range of frequencies, and determining the frequency at which the value of current is maximum (Fig. 4), and measuring oil temperature so as to compensate for temperature variations in the measurement current .

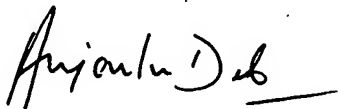
Schachameyer et al. (US 6,844,745 B1) discloses method of determining fluid condition of diesel engine lubricant in-situ (during real time operation) comprising applying alternating current voltage to electrodes 20,22 in a range of frequencies (Hi,Lo), measuring the current in electrode, and computing electrode interfacial impedance  $Z_s$ , and computing the impedance difference ( $\Delta Z = Z_s - \text{Bulk Fluid Impedance}$ ) for correlating with fluid condition X.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is 571-272-2228. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lefkowitz Edwards can be reached at 571-272-2180.



**Anjan K. Deb**

Patent Examiner

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5/7/05

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